North West Greenland. I suppose these build their igloos of stone because they have no wood, and prefer this kind of house to a snow hut, because the walrus which they kill in great numbers, and which, according to Drs. Kane and Hayes, forms their principal food, affords abundance of fat for fuel. A stone house with fire is warmer than a snow hut without it.

As the Esquimaux, of all people I have ever met with, most readily adapt themselves to circumstances at very short notice, I believe that these Arctic Highlanders could under every difficulty build kayaks for themselves, were they absolutely necessary, otherwise how can we account for the Esquimaux in the south of Greenland (whom Mr. Howorth believes to be the descendants of these Arctic Highlanders) having built both kayaks and oomiaks almost identical in form and construction with those in use among the "American Esquimaux" of Behring Strait and the Mackenzie, several thousand miles distant, with whom they could have no direct communication? This has always appeared to me a very curious circumstance difficult of solution, except by supposing that the "Skrelings" crossed Davis' Strait at its narrowest part from Cumberland Island to Greenland, a distance of 200 geographical miles—a theory which I do not think so probable as the one I have already advanced.

"The Arctic Highlanders have become alarmed at the rapid diminution of their numbers through famine and disease."

This feeling is not peculiar to the Arctic Highlanders, for both at Repulse Bay and at the Coppermine River a very similar story was told me.

Between 1847 and 1854, the dates of my two visits to Repulse Bay, forty or fifty of my old friends in that neighbourhood—men, women, and children—had died in one season, and nearly all from starvation, caused, I was told, by one of those erratic migrations of animals I have already mentioned.

Although there is every probability that the musk cattle, of which skulls are found scattered along the shores of Smith Sound, had been killed by the Esquimaux, the "absence of the lower jaws" is no proof that they were so killed. Wolves, foxes, or bears, would carry off these lower jaws and very likely "break them up," but the head itself would be rather an uncomfortable burden for the two first-named animals, and would not afford much nourishment to Bruin, and even his strong teeth would find an old musk bull's skull rather a hard nut to crack if he did attempt it.

"The American Esquimaux never go from their own hunting-range for any distance to the inhospitable north."

It is very difficult to define what "any distance" may mean, but I have known them go several hundred miles in one season to look out for fresh hunting-grounds or seas, either north or south, and if they find game they remain there. If the game moves away, the Esquimaux will follow it, whether north or south, if not stopped as trespassers by some of their own countrymen who have had previous occupation.

When I went to Repulse Bay in 1853, I was surprised and disappointed at finding no Esquimaux—for we wanted dogs from them—where a very considerable number had been in 1846-7. In the spring (1854) we found that none had wintered, as far as we could learn, within 200 miles of our winter quarters. The Chippewayan legend told by Sir John Franklin is well known to the Hudson's Bay Company's people.

The Indians resorted in old times to the deposits of native copper on the Coppermine River to obtain that useful metal, with which to make spear and arrow heads, &c.; and it was probably on one of these occasions that an Indian woman may have been carried off "across the sea" to Victoria on Wollaston Land," some points of which are within sight of and at no great distance from the Continent. Very likely, instead of being kept in slavery, some good fellow made her his wife, and treated her as such, much more kindly than she would have been treated among her own countrymen.

In fact, although the habits of the Esquimaux near the Coppermine have nothing of the Indian in them, the face and form of several that I have seen differ widely from the true Esquimaux type, thereby indicating a mixture of blood or races.

That admirable traveller and keen observer, Mackenzie, "certainly knew the country well," but he did not know much of the Esquimaux, for the simple reason that he had very little opportunity of becoming acquainted with them. As an authority on anything relating to the Indians, either east or west of the Rocky Mountains, no man could be more reliable.

Mackenzie says at p. 406 of his book, "They (the Esquimaux) never quit the coast." I think Sir Alexander Mackenzie meant by this that they never went inland; the only interpretation which would, I think, give his opinion any weight. If in saying "they never quit the coast," he meant that they never crossed the sea or ice to other lands or islands to the north, which he by his own observation could not possibly have known, it would be in perfect contradiction to the Chippewayan legend of the woman being carried across the sea, &c., and to our present knowledge.

It is not at all necessary for the American Esquimaux to cross Behring Strait to enable them to obtain articles of Russian manufacture from the Tchuktchi, nor for these to cross over to America for this purpose. A number of Russian trading-posts have for very many years been established in Russian America (now Alaska), and these traders have carried on a large and direct traffic in articles of Russian manufacture with the Tchuktchi and Esquimaux.

It is that very "fragment" of so-called Tchuktchi, of Tchuktchi Ness, found in the extreme north-eastern part of Asia, and a few of the Kamskatkans, whose language, custom, or physique resemble, to some extent, those of the Esquimaux, which I humbly think give strength to my belief in the original eastward migration of those curious people.

That there may have been a subsequent re-migration, so to speak, of Tchuktchi from America westward across Behring Strait to Asia, is, I think, very probable.

The Esquimaux and Tchuktchi of America, although they meet to trade for mutual advantage, are by no means friends, for they are (or were very recently) often at war with each other.

I can scarcely think that the American Esquimaux have been "sophisticated" by contact with the Indians. At the present time they differ from the Indians in every particular. In their dress, in their manners, in their mode of pitching their tents, of cooking and eating, fishing and hunting, in the form of their fish spears and hooks, in sewing, in the way of treating their wives, &c. Indeed, even at Churchill, where they come much in contact with the Indians, they seem to have acquired none of their habits or customs.

This letter has increased in length far beyond the limits I had contemplated, and I am almost ashamed to forward it to you with any hope of its finding a place in the columns of NATURE, but I felt almost bound to write something: first because an answer of some kind was required to the several arguments so well and ably used by Mr. Howorth, and secondly because I wished to comply with the hope he so pleasantly expressed that I would bring orward some more facts on my side. JOHN RAE

The Aurora of Feb. 4

IN the February number of NATURE just to hand I find an interesting account of this aurora. It may interest your readers to know that a very fine aurora was visible at Eden, 230 miles south of Sydney, at the same time. The notice sent me states that the aurora was visible from 1 A.M. to daylight of Feb. 5 (*i.e.* from 3 P.M. to 7 P.M. Feb. 4, Greenwich time); the auroral light extended from S.E. to S.W., and to an altitude of 60°. No other particulars were sent by the person who saw it; but it would appear that the auroral display must have commenced before it was observed in Europe. H. C. RUSSELL

Sydney Observatory, May 15

THE ZOOLOGICAL STATION AT NAPLES

LETTERS from Naples inform us that the construction of the building for the Zoological Station is now advancing rapidly. As the building is close to the sea, the foundations had to be laid with especial care, the more so as the heavy pressure of the aquarium tanks, the laboratory tanks, the library and the collections, would require even on ordinary ground some precaution.

We are glad to hear besides that Dr. Dohrn is most effectively assisted in the technical parts of the construction by Mr. W. A. Lloyd, of the Crystal Palace Aquarium, Sydenham. This gentleman, having been in friendly relations to Dr. Dohrn some years ago, when still in Hamburg, has obtained from the Board of the Crystal Palace Aquarium permission to render all possible help to the Naples station, as to an institution of a purely scientific character. Whoever knows the technical difficulties of

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such a construction will be exceedingly glad that so experienced a man as Mr. Lloyd lends his assistance in so disinterested a way to an establishment which we trust cannot fail to exert a powerful influence on the progress of scientific Biology.

We are further informed that Dr. Dohrn has already received considerable presents for the future library of the Zoological Station. The celebrated firm of Engelmann, Leipzig, has sent all works published by it on biological topics, and which had not yet formed part of Dr. Dohrn's private library. The value of these books exceeds 100*l.* Besides this Vieweg, of Brunswick, has sent all that he has published on Biology. Theodor Fischer, of Cassel, the well-known publisher of the magnificent "Palæontographica," has also made very liberal grants. Others are promised. We trust our English publishers will not hesitate to send their publications on biological topics as soon as application is made by the administration of the Station.

The entrance of these books, and of whatever goods may be sent to the Station, is freed from any duty by the Italian Government. Dr. Dohrn hopes to obtain in short time, from a great steamboat company, free transport for all the objects sent from England to the Station.

On all these and other points we hope to give more full and special information at the beginning of next month, when the Committee for the Foundation of Zoological Stations in different parts of the World, will publish its Report to the British Association.

ON ALPINE MAPS

MR. LESLIE STEPHEN says that the Alps are the playground of Europe, and he is not far wrong; but the majority of the boys who frequent this playground are acquainted with only a very few of its nooks and corners, and not a single one of them can pretend to know the whole of it. The Alps are not likely to be thoroughly explored for several generations yet to come; and I doubt not that it will be possible for men half a century hence to spend their ten or twelve seasons in the Alps, and still to find at the end of their time valleys which have not been described or even visited.

The Alps are very imperfectly known, and they are still more imperfectly mapped. A complete map of the entire chain of the Alps is yet wanting. I mean one embracing the whole of the land between the Mediterranean on the south and Munich on the north, and from the valley of the Rhone on the west to the frontiers of Styria and Hungary on the east. I believe it is correct to say that there is no map in existence on a scale of $\frac{1}{500000}$ of nature (or on nearly so large a scale) which contains the whole of the above indicated regions; and even the scale of $\frac{1}{500000}$ is much too small to permit justice to be done to the intricacies of the chain. So long as the Alps remain divided between several countries it is not likely that we shall possess a complete map of them upon an uniform scale; and as it is improbable that boundaries will be rearranged for the formation of an Alpine State, and more so that private individuals will be enterprising enough to meet the want, it is in the highest degree unlikely that a complete map of the Alps will be produced within many years. Nevertheless, materials for a complete map are rapidly accumulating; the greater part of the chain has been surveyed with considerable accuracy; and the attention of the reader is now invited to some of the more important of the maps which have been, or are being, produced after these surveys.

The Swiss Alps have been surveyed with a thoroughness which leaves little or nothing to be desired. The Government map of Switzerland, on a scale of $\frac{1}{100000}$ of nature, in 25 sheets, besides possessing in a most remarkable degree the essential qualities of accuracy and clearness, has, regarded as a whole, a unity and perfection which place it far in advance of any other maps of mountainous countries with which I am acquainted. I have carried it in hand over a large part of Switzerland; and whilst I have never been able to detect anything more than trifling inaccuracies, I have been continually filled with admiration for the consummate ability displayed even in its most minute details, and for its almost faultless expression of every variety of mountain form. It would be a poor compliment to it to say only that one can distinguish upon it slopes from precipices, jagged ridges from rugged ground, and the "ice-falls" of the glaciers from the gentle undulating snowy slopes of the upper regions. One can do much more than that. When its conventional methods of expression have been mastered (and it must always be remembered that line engraving is necessarily conventional), the peaks detach themselves from the valleys and soar aloft, and the mountaineer sees the Alps before him with all their marvellous diversity of architecture; nay, more, he can fix his line of assault, and will say, "Here, if anywhere, the summit may be gained."

The effect of the whole map is as satisfactory as its details. The junctions of the sheets are admirably effected and are scarcely perceptible,* the relief of the hills gradually augments from the lowlands upwards, and the *massifs* are projected—as it were embossed—with astonishing power; whilst the great features of the country (such, for example, as the upper valleys of the Rhone and of the Rhine) are depicted so clearly that a single glance is sufficient to fix them indelibly upon the memory. As a work of art (irrespective of its other merits) this map has extraordinary excellence, and, taken as a whole, I believe it to be perfectly unique.

There were special maps of several of the Swiss cantons before the great survey was undertaken, but the map in 25 sheets is the first general official map of Switzerland that has been produced. It is drawn with what is termed *oblique light*—that is to say, with the light proceeding from the left-hand top corner to the right-hand bottom corner; and this treatment (which the Swiss Staff maintain with reason is the natural and the only effective system possible for a mountainous country) is employed consistently through all the sheets. A great part of the artistic effect of the map when the sheets are joined together is due to this treatment. The system of *central light*, which is sometimes adopted for maps, does not answer for a mountainous country; for it is evident, if it is employed in a map with numerous sheets, that each sheet becomes isolated from the surrounding ones, and unity of effect is impossible.

The claims of the draughtsmen and engravers of the Swiss map are deserving of especial recognition. It could not have been produced in its wonderful perfection unless every person employed upon it had been devoted to the work, and possessed of rare ability. But I believe that the reason of the extraordinary uniformity in the excellence of its parts, and of the unity of the whole, is found in the fact that the entire drawings and plates (and a great part of the survey†) were executed under the direction of a single head, namely, that of General Guillaume Henri Dufour.‡ The map is popularly and properly termed the "Carte Dufour."

The Swiss are keenly alive to the value and uses of good maps, and since 1869 have commenced a great one, which, in its dimensions at least, dwarfs the Carte Dufour

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* For an example of the admirable way in which these sheets will join together, the reader is referred to a map of the Canton Uri, issued by the Swiss Statsbureau in 1867, which is composed of portions of four of the sheets of the Dufour map.

† The triangulation was commenced at the end of the last century by the cantons, and in 1828 was taken into the hands of the Confederation. The triangles of the first order were brought to a conclusion in 1840. The first sheet appeared in 1845, and the last one in 1864. In connection with the survey the names of Bétemps, Coaz, Mohr, and Colonel Siegfried should be mentioned. The last-named gentleman is, since 1864, director of the Topographical Bureau.

‡ Born 1787; entered the Federal Staff 1817; Colonel 1827.

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